US008607406B2

(12) **United States Patent**
Miefalk et al.

(10) **Patent No.: US 8,607,406 B2**
(45) **Date of Patent: Dec. 17, 2013**

(54) **HAND HELD VACUUM CLEANER**

(75) Inventors: **Häkan Miefalk**, Järfälla (SE); **Fredrik Bergling**, Skäret (SE); **Stefan Jonsson**, Stockholm (SE); **Esbjörn Svantesson**, Stockholm (SE); **Christian Ågren**, Stockholm (SE)

(73) Assignee: **AB Electrolux** (SE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/555,560**

(22) Filed: **Jul. 23, 2012**

(65) **Prior Publication Data**

US 2013/0031742 A1 Feb. 7, 2013

Related U.S. Application Data

(63) Continuation of application No. 10/544,927, filed as application No. PCT/SE2004/000136 on Jan. 30, 2004, now Pat. No. 8,225,456.

(30) **Foreign Application Priority Data**

Feb. 10, 2003 (SE) 0300355

(51) **Int. Cl.**
A47L 5/26 (2006.01)

(52) **U.S. Cl.**
USPC **15/328**; 15/329; 15/344; 15/410; 15/DIG. 1

(58) **Field of Classification Search**
USPC ..... 15/328, 329, 339, 344, 410, DIG. 1
IPC A47I 5/26
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,707,792	A	5/1955	Waller
2,863,524	A	12/1958	Buda
3,199,138	A	8/1965	Nordeen
3,621,640	A	11/1971	Ohno et al.
3,653,189	A	4/1972	Miyake et al.
3,906,219	A	9/1975	Stauffer
4,213,224	A	7/1980	Miller

(Continued)

FOREIGN PATENT DOCUMENTS

CA	2087056	7/1994
CN	1272873.X	1/2003

(Continued)

OTHER PUBLICATIONS

"The BOSS, Heavy Duty Rechargeable Vacuum, Model 98," Eureka brochure dated 1998, 2 pages.

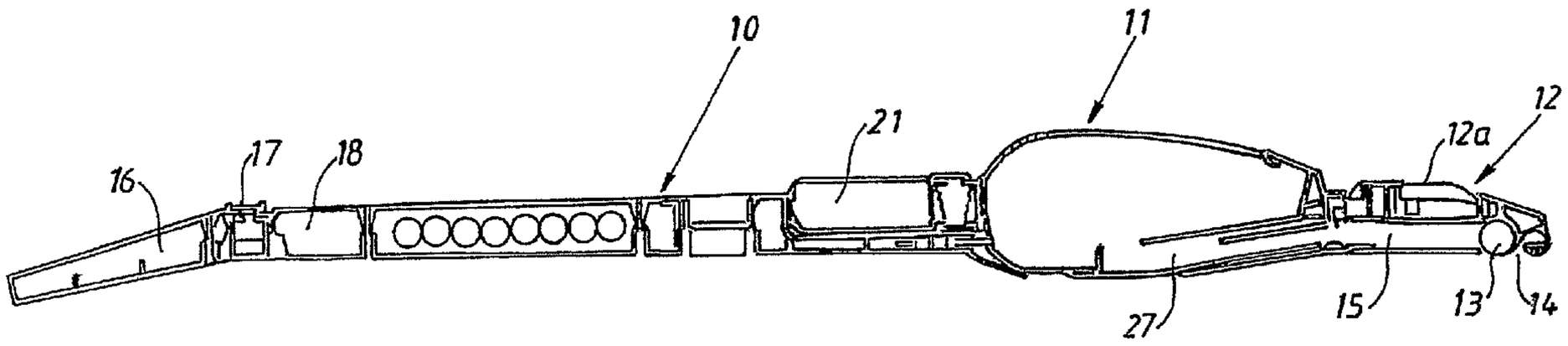
(Continued)

Primary Examiner — David Redding
(74) *Attorney, Agent, or Firm* — RatnerPrestia

(57) **ABSTRACT**

A vacuum cleaner apparatus for securing a hand held vacuum cleaner having a housing, the housing comprising a motor-fan unit, a dust container, and an air passage. The vacuum cleaner apparatus has a shaft part to which the housing can be secured, the shaft part comprising a handle and one or more batteries. The vacuum cleaner apparatus also has a floor nozzle and a tube passage configured to connect the floor nozzle to the air passage when the housing is secured to the shaft part.

8 Claims, 7 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

4,276,070	A	6/1981	Hug
4,376,322	A	3/1983	Lockhart et al.
4,421,964	A	12/1983	Buchtel
4,467,493	A	8/1984	Buchtel
4,541,142	A	9/1985	Pudwill
4,545,089	A	10/1985	Oxel
4,573,234	A	3/1986	Kochte et al.
4,573,237	A	3/1986	Kochte et al.
4,621,390	A	11/1986	Hampton et al.
4,635,315	A	1/1987	Kozak
4,665,582	A	5/1987	Richmond et al.
4,670,701	A	6/1987	Sako et al.
4,704,765	A	11/1987	Ataka
4,748,713	A	6/1988	Sepke et al.
4,766,638	A	8/1988	McDowell
4,787,923	A	11/1988	Fleigle et al.
4,804,481	A	2/1989	Lennartz
D300,214	S	3/1989	Adams
4,821,366	A	4/1989	Levine
4,831,685	A	5/1989	Bosyj et al.
4,841,594	A	6/1989	Elson et al.
D304,104	S	10/1989	Busalt et al.
4,876,763	A	10/1989	Cho et al.
4,894,882	A	1/1990	Toya
4,899,418	A	2/1990	Steiner et al.
D307,657	S	5/1990	Li
4,920,606	A	5/1990	Gerke, Jr. et al.
4,920,608	A	5/1990	Hult et al.
4,928,346	A	5/1990	Elson et al.
4,934,020	A	6/1990	Jackson
4,942,641	A	7/1990	Gerke, Jr. et al.
4,947,514	A	8/1990	Gerke, Jr. et al.
4,967,443	A	11/1990	Krasznai et al.
4,993,106	A	2/1991	Hult et al.
5,005,252	A	4/1991	Steiner et al.
5,020,187	A	6/1991	Kosten et al.
5,025,529	A	6/1991	Hult et al.
5,035,024	A	7/1991	Steiner et al.
5,065,473	A	11/1991	Krasznai et al.
5,107,567	A	4/1992	Ferrari et al.
5,309,600	A	5/1994	Weaver et al.
5,322,534	A	6/1994	Kaiser
5,342,433	A	8/1994	Avondoglio
D352,807	S	11/1994	Sanderud
D364,013	S	11/1995	Klingspor et al.
5,524,321	A	6/1996	Weaver et al.
5,561,885	A	10/1996	Zahuranec et al.
5,584,095	A	12/1996	Redding et al.
5,603,740	A	2/1997	Roy
5,661,885	A	9/1997	Donato
5,715,566	A	2/1998	Weaver et al.
5,733,351	A	3/1998	Hult et al.
5,819,364	A	10/1998	Sham
5,869,947	A	2/1999	Zahuranec et al.
5,966,774	A	10/1999	Bone et al.
6,029,313	A	2/2000	O'Dea et al.
6,094,775	A	8/2000	Behmer
6,108,864	A	8/2000	Thomas et al.
6,122,796	A	9/2000	Downham et al.
6,125,498	A	10/2000	Roberts et al.
6,131,239	A	10/2000	White
6,146,434	A	11/2000	Scalfani et al.
6,189,178	B1	2/2001	Roberts
6,311,366	B1	11/2001	Sepke et al.
6,324,714	B1	12/2001	Walz et al.
6,428,589	B1	8/2002	Bair et al.
6,434,785	B1	8/2002	Vandenbelt et al.
6,546,592	B1	4/2003	Cockburn et al.
6,562,093	B2	5/2003	Oh
6,571,421	B1	6/2003	Sham et al.
6,625,845	B2	9/2003	Matsumoto et al.
6,647,587	B1	11/2003	Ohara et al.
6,658,693	B1	12/2003	Reed, Jr.
6,736,873	B2	5/2004	Conrad et al.
6,766,558	B1	7/2004	Matsumoto et al.
6,775,882	B2	8/2004	Murphy et al.
6,811,584	B2	11/2004	Oh
6,824,580	B2	11/2004	Oh
6,839,934	B2	1/2005	Houghton et al.
6,857,165	B2	2/2005	Oh
6,928,690	B2	8/2005	Ji
6,948,211	B2	9/2005	Stephens et al.
6,964,082	B2	11/2005	Hsu
6,968,596	B2	11/2005	Oh et al.
7,377,007	B2	5/2008	Best
7,383,609	B2	6/2008	Ji
7,386,916	B2	6/2008	Bone
7,404,838	B1	7/2008	Pathak
7,412,749	B2	8/2008	Thomas et al.
7,507,269	B2	3/2009	Murphy et al.
2002/0042969	A1	4/2002	Nagai et al.
2002/0073504	A1	6/2002	Hall et al.
2002/0189048	A1	12/2002	Maruyama et al.
2003/0019073	A1	1/2003	Oh
2003/0159235	A1	8/2003	Oh
2003/0163887	A1	9/2003	Inoue
2003/0208879	A1	11/2003	Oh et al.
2003/0213091	A1	11/2003	Oh et al.
2004/0040270	A1	3/2004	Inoue et al.
2004/0098957	A1	5/2004	Yoo et al.
2004/0103496	A1	6/2004	Worwag
2004/0134022	A1	7/2004	Murphy et al.
2004/0177471	A1	9/2004	Jung et al.
2004/0187253	A1	9/2004	Jin et al.
2004/0200029	A1	10/2004	Jin et al.
2004/0216263	A1	11/2004	Best
2004/0261212	A1	12/2004	Park et al.
2004/0261213	A1	12/2004	Park et al.
2005/0005390	A1	1/2005	Lee et al.
2005/0005391	A1	1/2005	Park
2005/0081321	A1	4/2005	Milligan et al.
2005/0125939	A1	6/2005	Hansen et al.
2005/0125940	A1	6/2005	McDowell
2005/0183406	A1	8/2005	Coburn
2006/0064828	A1	3/2006	Stein et al.
2006/0090290	A1	5/2006	Lau
2006/0156508	A1	7/2006	Khalil
2007/0163075	A1	7/2007	Butler et al.
2007/0271724	A1	11/2007	Hakan et al.

FOREIGN PATENT DOCUMENTS

DE	G 79 29 844.5		3/1981
DE	32 28 491	A1	2/1984
DE	33 09 162	A1	9/1984
DE	33 25 336		1/1985
DE	8623004		10/1986
DE	37 43 083	A1	6/1989
DE	G 90 10 066.2		10/1991
DE	G 91 14 371.3		4/1992
DE	4038262		6/1992
DE	19630286		1/1998
DE	10110581		11/2001
DE	10124216		1/2002
EP	0 170 720		2/1986
EP	0 215 619	A2	3/1987
EP	0 827 710	A2	3/1998
EP	0853917		7/1998
EP	0914795	A2	12/1999
EP	1 070 478		1/2001
EP	1224898		7/2002
EP	1 279 362		1/2003
FR	2603181		6/1987
GB	857580		12/1960
GB	990065		4/1965
GB	1201841		8/1970
GB	2035787	A	6/1980
GB	2137896		10/1984
GB	2155314		9/1985
GB	2189382	A	10/1987
GB	2268875		1/1994
GB	2291790		7/1994
GB	2 349 105		10/2000
GB	2 372 434		8/2002

(56) **References Cited**

FOREIGN PATENT DOCUMENTS

GB	2398486	A	8/2004
GB	2413942		11/2005
JP	54-100149		8/1979
JP	3-267032		11/1991
JP	4364822		12/1992
JP	52-73557		10/1998
JP	2000-070198		3/2000
JP	2001-095735		4/2001
JP	2001353110		12/2001
JP	2002 085297	A	3/2002
JP	2002 136456	A	5/2002
JP	2003 275154	A	9/2003
JP	4364822		11/2009
SE	514314	C2	3/1998
SE	510283	C2	10/1998
WO	WO 97/20492		6/1997
WO	WO 03/009736		2/2003
WO	WO 2004/069021		8/2004
WO	WO 2005/111084		11/2005

OTHER PUBLICATIONS

Color printouts of http://www.zweita.net/ "Product Info" (3 pages).
Color printouts of http://www.igia.com/prodetail.cfm?ID=AT7290 "IGIA Vac Blue" (3 pages).
Color printouts of http://www.igia.com/prodetail.cfm?ID=AT7739 "Wind Storm Vacuum" (3 pages).
Color printouts of http://www.igia.com/prodetail.cfm?ID=AT7691 "Wind Storm Wet/Dry Vacuum" (1 page).
Color printouts of http://www.sewserg.com/products/abp09802-0775.html "Wind Storm AT7813 3in1 Upright, Stick & Hand Held Bagless Vacuum Cleaner Windstorm, 4 Attachments, Fold Down Handle for Storage, Weighs under 8 Pounds" (4 pages).
Color printouts of http://www.sewserg.com/products/abp02698.html Miele S147 Little Giant Plus Vacuum Cleaner with Free 5 YR Extended Warranty/Replacement.
Fakir product pages catalogue, 2002 (5 pages).
Black & white printouts of http://www.zweita.net/ "Product Info" (3 pages).
Black & white printouts of http://www.igia,com/prodetail.cfm?ID=AT7290 "IGIA Vac Blue" (3 pages).
Black & white printouts of http://www.igia.com/prodetail.cfm?ID=AT7739 "Wind Storm Vacuum" (3 pages).
Black & white printouts of http://www.igia.com/prodetail.cfm?ID=AT7691 "Wind Storm Wet/Dry Vacuum" (1 page).
Black & white printouts of http://www.sewserg.com/products/abp09802-0775.html "Wind Storm AT7813 3in1 Upright, Stick & Hand Held Bagless Vacuum Cleaner Windstorm, 4 Attachments, Fold Down Handle for Storage, Weighs under 8 Pounds" (3 pages).
Black & white printouts of http://www.sewserg.com/products/abp02698.html Miele S147 Little Giant Plus Vacuum Cleaner with Free 5 YR Extended Warranty/Replacement (3 pages).

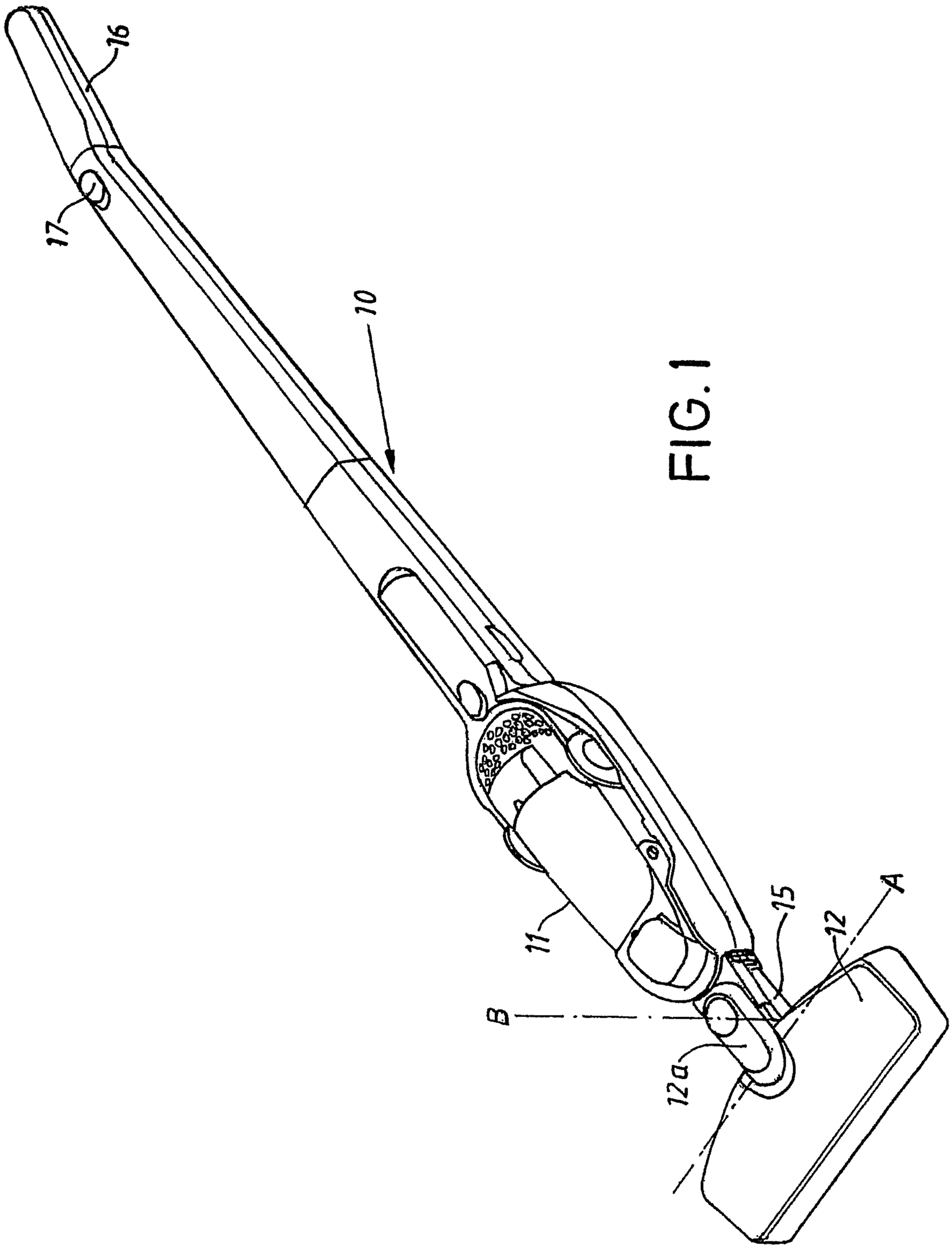


FIG. 1

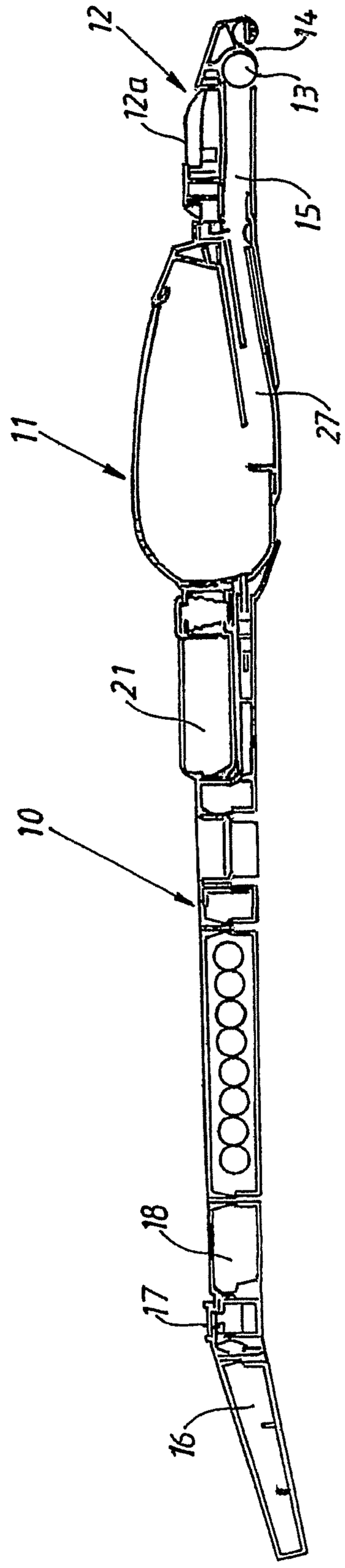


FIG. 2

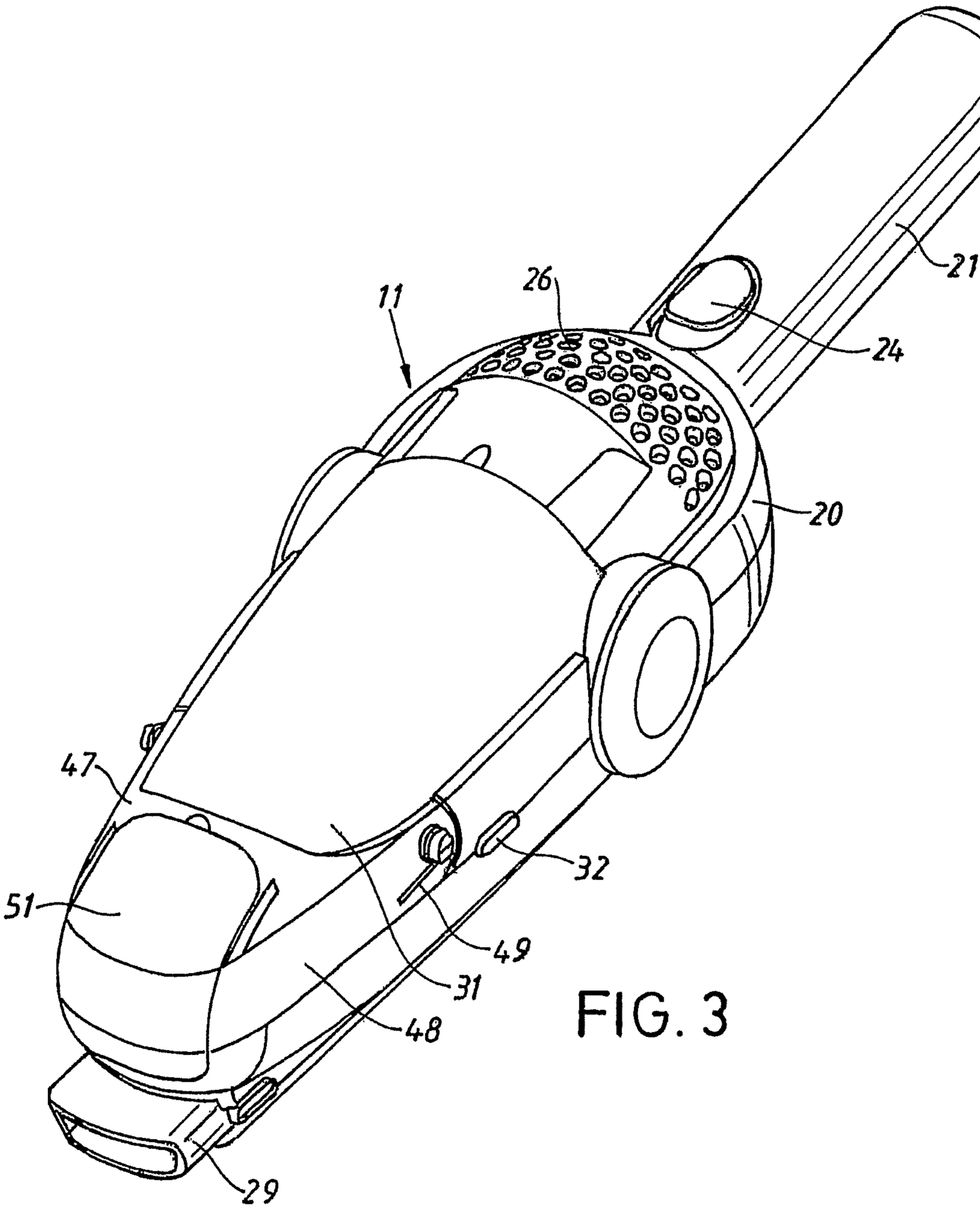


FIG. 3

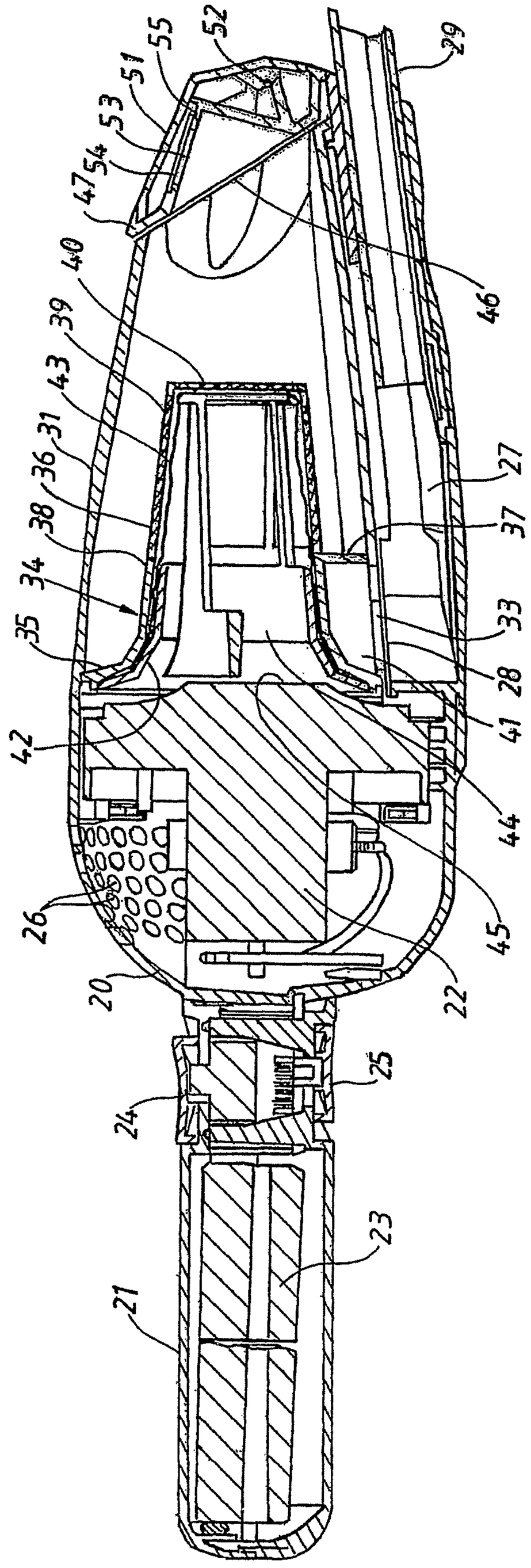

55
52
51
53
54
47
29
40
39
46
43
31
36
38
34
35
27
37
33
28
41
42
44
45
26
20
22
25
24
23
21

FIG. 4

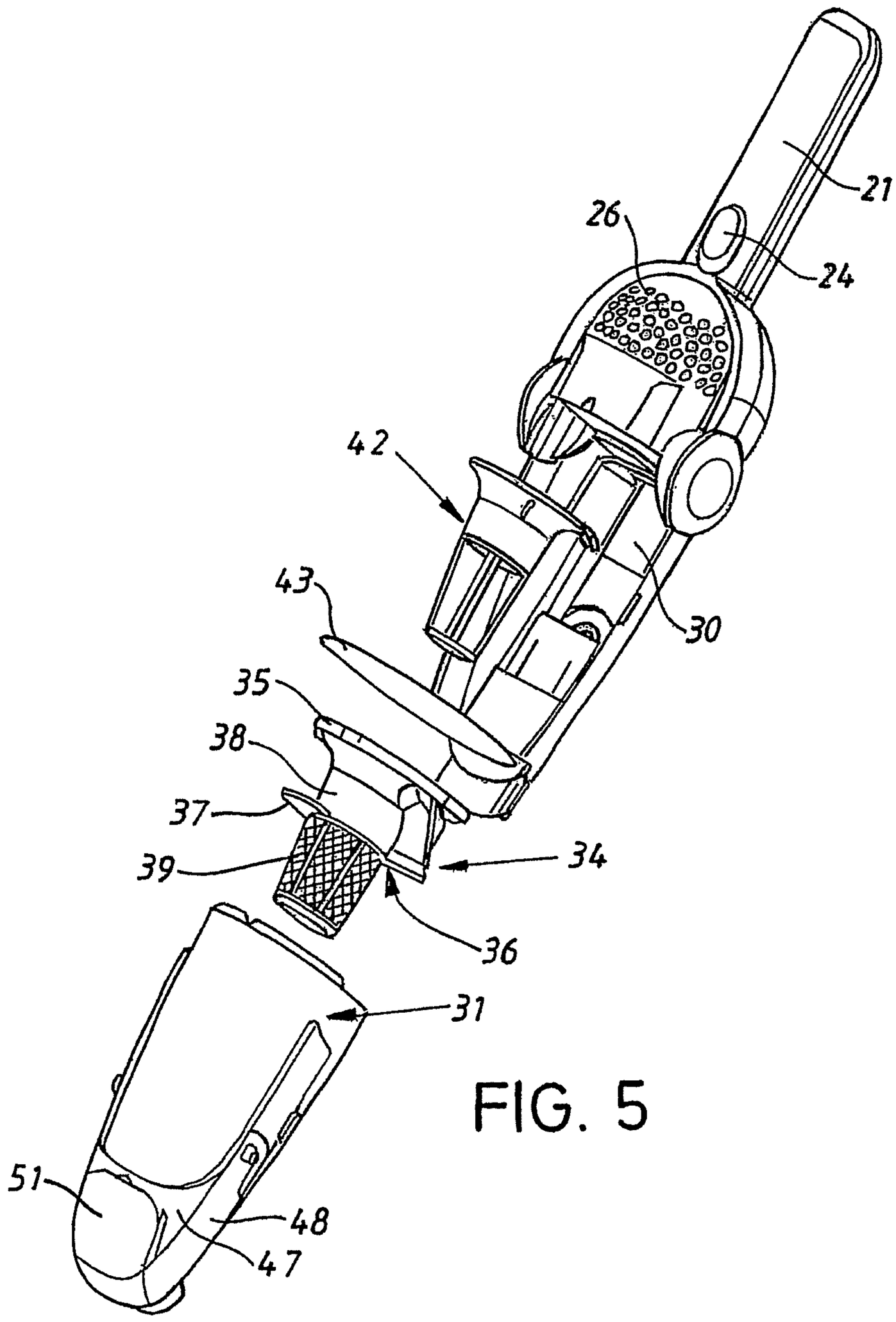


FIG. 5

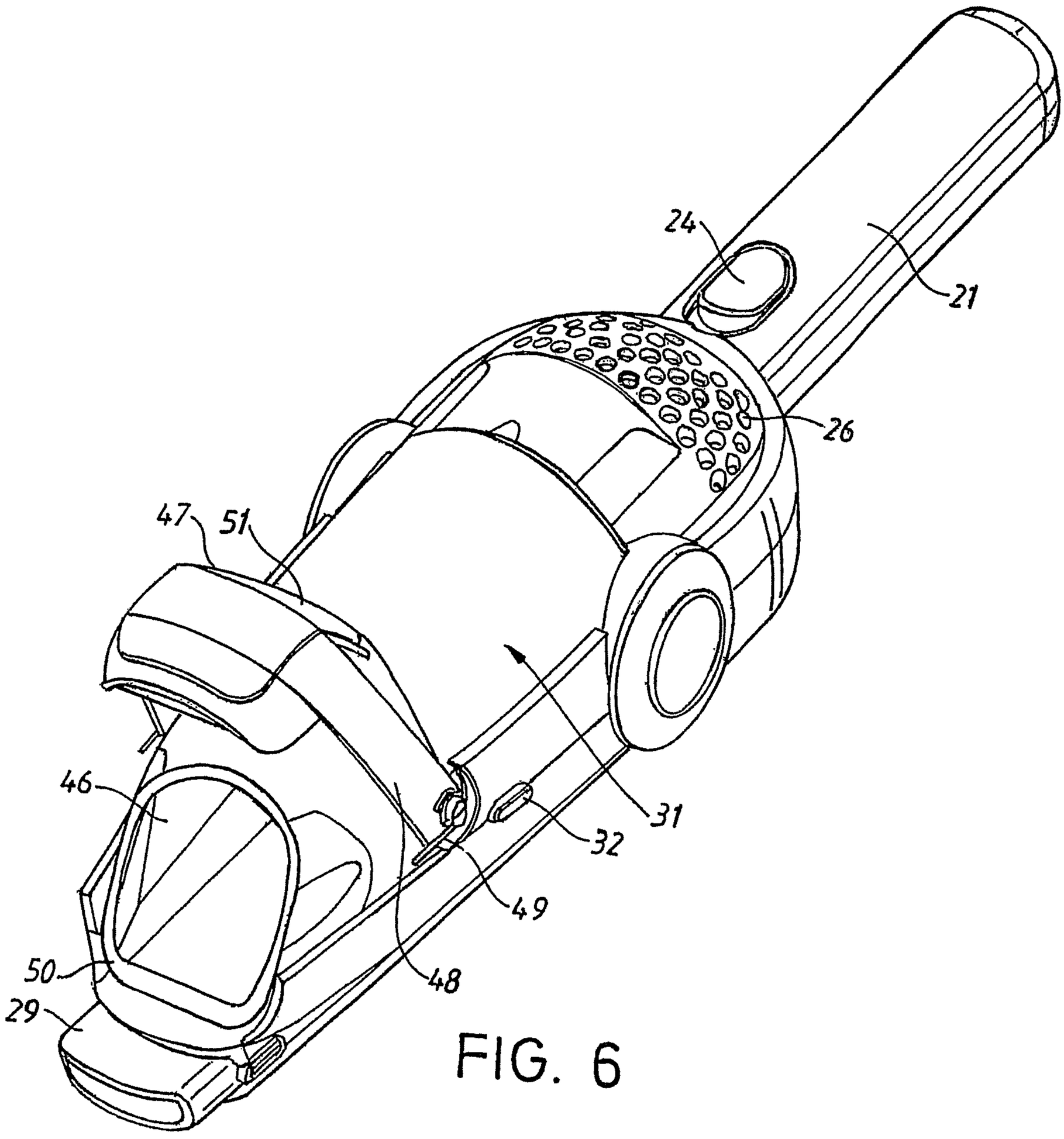


FIG. 6

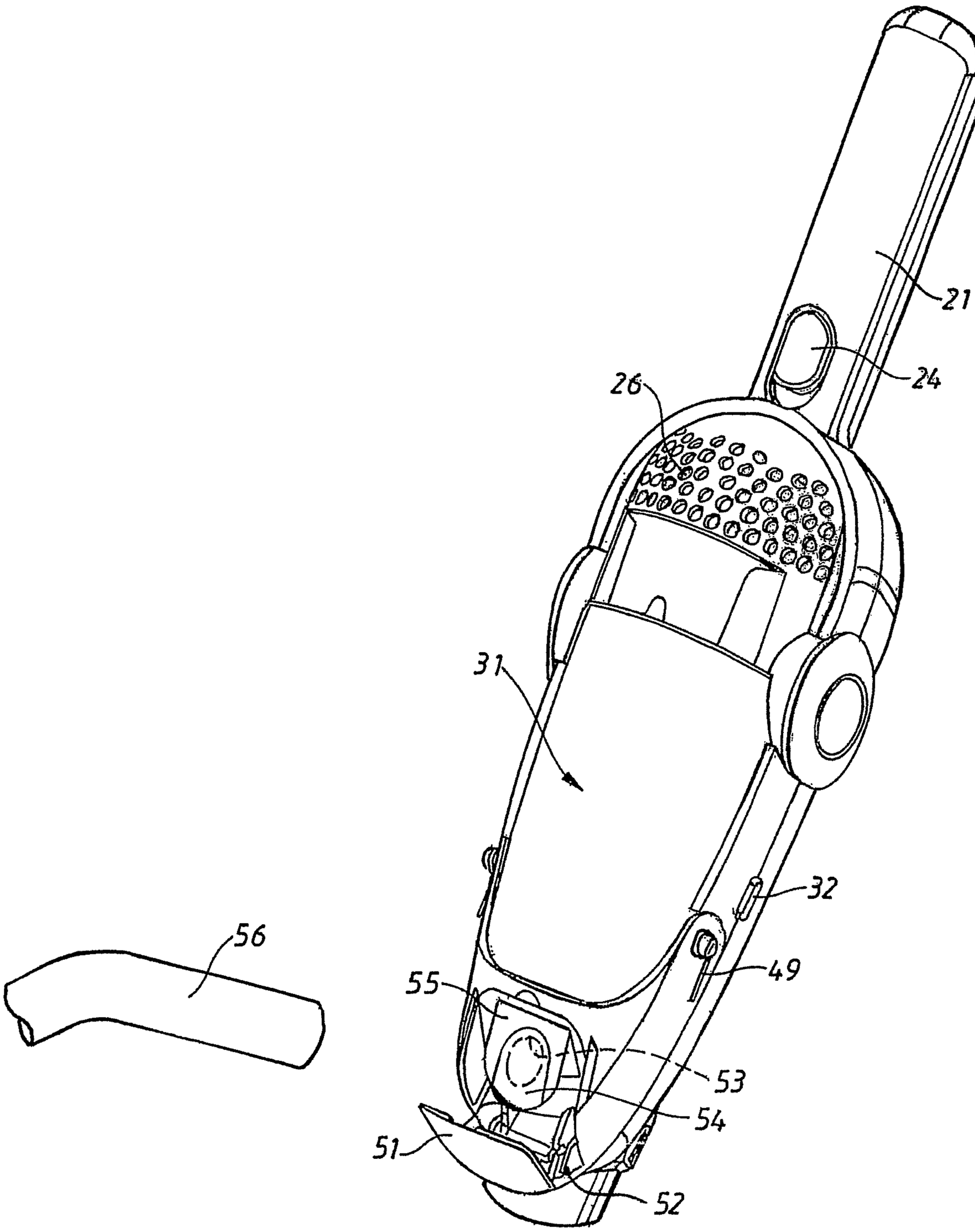


FIG. 7

HAND HELD VACUUM CLEANER

FIELD OF THE INVENTION

This application is a continuation of U.S. application Ser. No. 10/544,927, filed Apr. 13, 2007, now U.S. Pat. No. 8,225,456, which was filed under 35 USC §371 of International Application No. PCT/SE2004/000136 filed Jan. 30, 2004 which claims priority to Swedish Application No. 0300355-5 filed on Feb. 10, 2003, the disclosure of each which is included herein by reference in its entirety. This invention relates to a hand held vacuum cleaner comprising a housing supporting a motor-fan unit, a dust container and an air passage ending in the dust container through which dust laden air is directed into the dust container, the vacuum cleaner also comprising at least one filter arranged after the dust container as seen in the flow direction, the dust container constituting a part of a cyclone separator arranged between the air passage and the filter.

BACKGROUND

Hand held vacuum cleaners which are battery powered as well as powered by mains supply, are previously known, see for instance U.S. Pat. No. 4,967,443, and are used for fast cleaning of small surfaces. It is important that such vacuum cleaners are easily accessible and user friendly designed. These vacuum cleaners are usually designed such that the dust container together with the filter can be removed from the remaining part of the vacuum cleaner housing that contains the fan unit. In order to empty the vacuum cleaner also the filter has to be removed from the dust container before the content can be emptied through the opening which is established when the filter has been taken away. Removal of the dust from the dust container is hence troublesome, dirty and time consuming. It should in this connection be mentioned that the volume of the dust container for this type of vacuum cleaners is very limited and that the filter is rapidly clogged which means lost suction efficiency and that emptying has to be done with short intervals.

It is further known, see EP 914795, to provide a hand held vacuum cleaner of the type mentioned above with a large opening covered by a pivotable lid in order to facilitate emptying but since the dust usually gets stuck to the filter the dust can not be easily poured out of the opening. Moreover since the conventional filter system is quickly clogged the suction efficiency is still not sufficient.

It is also previously known to use the type of hand held vacuum cleaner described above in combination with a shaft part whose, lower portion supports a nozzle (so called stick cleaner), see for instance SE 9701543-2. The shaft part is provided with a tube connection by means of which dust laden air is transferred from the nozzle to the air inlet of the hand held vacuum cleaner which is removably secured to the shaft part. This means that the combined stick cleaner in a comfortable way can be used for floor cleaning purpose. Of course this type of vacuum cleaners also has the same disadvantages as the hand held vacuum cleaner described above with respect to filter clogging and handling when being emptied.

SUMMARY OF THE INVENTION

The purpose of this invention is to create an arrangement which eliminates a too fast clogging of the filter and which facilitates emptying of the vacuum cleaner at the vacuum

cleaner types described above. This is achieved by means of a device having the characteristics mentioned in the claims.

In a first aspect, the present invention provides a hand held vacuum cleaner having a housing, a motor-fan unit, a dust container, an air passage opening into the dust container and through which dust laden air is directed into the dust container, and at least one filter arranged after the dust container, as seen in the flow direction. The dust container has a first emptying opening, which is normally being covered by a lid and is sized such that it allows the dust collected in the dust container to fall out through the opening when the lid is opened. The dust container also has a second emptying opening that is adapted to be fluidly connected to an external vacuum source via a connection.

In a second aspect, the present invention provides a vacuum cleaner having a housing, a motor-fan unit contained in the housing and having a motor-fan inlet opening, an air inlet passage, and a dust container selectively attachable to the housing. The dust container has a container air inlet adapted to be in fluid communication with the air inlet passage when the dust container is attached to the housing, a container air outlet located at a first end of the dust container and adapted to be in fluid communication with the motor-fan inlet opening when the dust container is attached to the housing, a filter positioned between the container air inlet and the container air outlet, a first emptying opening having a first cover associated therewith, and a second emptying opening having a second cover associated therewith. In this aspect, the dust container can be emptied through the first emptying opening without removing the dust container from the housing.

In a third aspect, the present invention provides a dust container for a vacuum cleaner. The dust container has an air inlet, an air outlet, a first dirt outlet, and a second dirt outlet. The first and second dirt outlets are separate from the air outlet.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention will now be described with reference to the accompanying drawings in which

FIG. **1** is a perspective view of the vacuum cleaner in question together with a shaft part,

FIG. **2** is a schematic sectional view through the shaft part shown in FIG. **1**,

FIG. **3** is a perspective view of the vacuum cleaner being removed,

FIG. **4** is a sectional view through the vacuum cleaner,

FIG. **5** is an exploded view showing the vacuum cleaner being separated and at the emptying procedure,

FIG. **6** is a perspective view of the vacuum cleaner showing a different method for emptying the vacuum cleaner whereas

FIG. **7** in a perspective view shows a further method for emptying the vacuum cleaner.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

As appears from FIG. **1** the shown vacuum cleaner comprises an elongated shaft part **10** in which a hand held vacuum cleaner **11** is removably arranged. The lower end of the shaft part supports a floor nozzle **12** enclosing an electrically driven brush roll **13**, not described in detail, and which is turnably secured to the shaft part **10**. The nozzle has an elongated suction opening **14** extending in the length direction of the nozzle and the suction opening is via a flexible tube passage **15** connected to the hand held vacuum cleaner **11** in a manner which will be described below. The upper portion of the shaft

part **10** is shaped as a handle **16** and has an operating knob **17** that via an electric circuit, not shown in detail, is connected to the hand held vacuum cleaner when it is secured to the shaft part. The shaft part might also enclose one or several batteries **18** which are connected to the electric circuit.

The nozzle **12** is provided with a supporting part **12***a* having one end that via a shaft is pivotally arranged about a first axis A extending mainly horizontally and mainly parallel to the suction opening **14**. The other end of the supporting part **12***a* is pivotally secured to the lower portion of the shaft part **10** about a second axis B that is mainly perpendicular to the length direction of the shaft part **10** and to the first axis A. This means that there is a double link arrangement between the shaft part **10** and the nozzle **11**, which gives an excellent maneuverability of the vacuum cleaner when being used as a stick cleaner. This arrangement also makes it possible to easily hide the electric wires between the shaft part **10** and the nozzle within the support arm **12***a*. In order to create a reliable nozzle link the shaft ends defining the axis A are supported by two shaft supports comprising separate units that are removably inserted into pockets in the nozzle.

The hand held vacuum cleaner **11** comprises a housing **20** with a handle **21** and the housing encloses a motor-fan unit **22** driven by one or several batteries **23** placed in the handle **21**. The motor-fan unit is controlled by means of a control knob **24** placed at the handle and the part of the electric circuit which is placed in the hand held vacuum cleaner is via a connection **25** connected to the part of the circuit which is placed in the shaft part **10** when the hand held vacuum cleaner is fixed to the shaft part **10**. The housing is provided with several openings **26** through which the air flowing through the fan unit leaves the housing. The housing also has an inlet channel **27** extending from the front part of the housing to an outlet opening **28** arranged at the middle part of the housing. In the channel **27** a tube part **29** is slidably arranged the outer end of the tube part being shaped as a nozzle. When the hand held vacuum cleaner is fastened to the shaft part the tube part **29** is pushed into the channel **27** and is thereby a direct continuation of the tube passage **15** of the shaft part. The tube part can also be pulled out to an extended position and by means of a retaining mechanism, not shown, be locked temporarily in the extended position.

The housing is provided with a recess **30** in which a dust container **31** is removably arranged the dust container being removed by means of locking knobs **32** arranged at each side of the container. The dust container **31** is shaped as an elongated body with an open end and is partly made of transparent material. Close to the open end of the dust container there is an inlet **33** that is coaxial to the outlet opening **28** of the channel **27**. The open end is partly covered by a filter liner **34** that follows the dust container when it is removed from the housing but which is removably arranged with respect to the dust container. The filter liner comprises a collar shaped portion **35** resting against a seat arranged at the wall of the dust container the collar shaped portion continuing into a sleeve shaped portion **36** centrally arranged in the dust container. The sleeve shaped portion has a flange **37** overbridging the distance between the sleeve shaped portion **36** and the surrounding container wall and extends around a part of the circumference of the sleeve shaped portion. The part **38** of the sleeve shaped portion which is placed at one side of the flange **37** is together with the collar shaped portion **35** made by homogenous material whereas the part which is placed at the other side of the flange comprises a grating structure which is covered by a coarse filter **39** that also extends over the end **40** of the sleeve shaped portion. The coarse filter **39** preferably comprises a washable fine meshed plastic net. Further the filter liner **34** is provided with a radially extending wall **41** that stretches between the flange **37** and the collar shaped portion **35** close to the inlet **33**. The wall **41** prevents the dust in the dust container from falling out through the inlet **33** if the vacuum cleaner should be turned up-side-down and also limits an annular flow channel around a part of the circumference of the filter liner **34**. When dust laden air flows through this channel it contributes to the creation of a vortex in the dust container which will thus operate as a cyclone separator in which larger particles are separated from the air flow at the same time as the process is visualized through the transparent container wall. Thus, the cyclone prevents the filter from being clogged by means of larger dust particles and dirt. By means of the transparent container wall it is also possible to see the dust level in the container and hence also to establish when it is time to empty the container.

The filter liner **34** encloses a removable support body **42** for a fine filter **43** for instance a flat circular paper filter that can be clamped between the support body **42** and the filter liner **34**. The support body **42** mainly has the same sleeve shape as the filter liner **34** but is somewhat smaller and forms a flow passage **44** for the air which flows through the coarse filter **39** and the fine filter **43** to the inlet opening **45** of the fan unit. Alternatively the fine filter can be replaced by a body of foamed plastic or the like to separate finer particles after the coarse filter whereby the body is secured in a suitable way in the filter liner.

The dust container has a large emptying opening **46** extending over the entire bottom part of the dust container and the opening is normally covered by a lid **47** supported by a yoke **48** turnably secured at each side of the dust container the yoke being acted on by two springs **49** normally pressing the lid against a seal **50** surrounding the opening **46**.

The lid **47** supports a flap **51**, that is turnably fastened to the lid **47** by means of dowels **52**, and is normally hiding a small, circular emptying opening **53** which is connected to the inside of the dust container. This opening might be covered by a tongue **54** of elastic material which is fastened at one of its sides and rests against a seat **55** surrounding the opening **53** the tongue serving as a check valve that opens when a tube **56** connected to an outer vacuum source is pressed against the seat **55** or is inserted into the opening **53**. Instead of using an elastic tongue it is of course possible to provide the seat **55** or the flap **51** with a sealing that prevents air from flowing through the emptying opening **53** into the dust container when the flap is closed.

The hand held vacuum cleaner is used and operates in the following manner. In normal use the hand held vacuum cleaner **11** is removed from the shaft part **10** after which the tube part **29** is pulled out to the outer position. Then the motor fan unit is started by acting on the operating knob **24**. This means that air together with dirt particles are sucked in through the tube part **29** and the inlet channel **27**. The dust laden air flows through the outlet opening **28** and the inlet **33** of the dust container **31** after which the dust laden air flows into the channel which is limited by the filter liner **34**, the flange **37** and the wall of the dust container and extending around the sleeve shaped portion **36**. Thereby a vortex is created in the dust container the vortex separating heavier particles from the air flow such that they can be collected at the bottom of the container. The air then flows further through the coarse filter **39** and the fine filter **43** to the flow passage **44** from which the cleaned air leaves to the inlet opening **45** of the fan unit. After having passed the fan unit the air then leaves to atmosphere via the openings **26**.

In order to empty the hand held vacuum cleaner there are three different alternatives. By manually opening the lid **46**

against the action of the springs **49** the operator can uncover the emptying opening **46** and the collected dust is allowed to fall freely out of the opening or to be shaken out through it. This means a quick emptying function without the need for removing the dust container from the hand held vacuum cleaner. A second quick emptying alternative is, when the operator uses a larger type of vacuum cleaner during a conventional vacuum cleaning operation, to open the flap **51** and press the inlet opening of the tube handle **56** of the larger vacuum cleaner against the seat **55**. This means that the tongue **54** because of the vacuum created by the larger vacuum cleaner will uncover the opening **53** and the content in the dust container **31** will be sucked over to the dust container of the larger vacuum cleaner. Thereby also the coarse filter **39** and the fine filter **43** will be cleaned by the air that flows backwards through the hand held vacuum cleaner. A further emptying alternative is to remove the dust container **31** from the housing **20** by acting on the locking knobs **32**. Thereby the dust container is removed together with the filter liner **34**, the fine filter **43** and the support body **42**. By removing the last mentioned three parts from the dust container it can be emptied and the dust container **31**, the filter liner **34** with the coarse filter **39** and the support body **42** can be cleaned separately and a new fine filter **43** can then be applied on the support body **43** before it is again inserted into the filter liner **34**. The filter liner will then be folded such that it achieves a large filter area. The filter liner **34** can then again be inserted into the dust container **31** before the dust container is locked in the housing **20**.

The hand held vacuum cleaner **11** can, if the operator so desires, be fixed to the shaft part **10** whereby the tube part **29** is moved to its retracted position at the same time as the electrical circuit of the hand held vacuum cleaner via the connection **25** is connected to the electrical circuit in the shaft part. This means that the motor fan unit of the hand held vacuum cleaner and the electric motor of the brush roll **13** now can be activated by means of the operating knob **17** whereby additional energy is supplied by means of the batteries **18** in the shaft part. The shaft part can then be used as a normal so called stick cleaner for cleaning larger surfaces such as a floor whereby dust laden air is sucked in through the nozzle **12**. This air via the flexible tube passage **15** passes to the inlet channel **27** of the hand held vacuum cleaner after which the dust particles are separated in the dust container **31** in a manner described above.

It should be stressed that the hand held vacuum cleaner and/or the shaft part in a conventional manner is provided with a connection, not shown, for an electrical charger to charge the batteries which are placed in the shaft part and/ or the hand held vacuum cleaner. The vacuum cleaner might of course also be mains supplied.

The invention claimed is:

1. A vacuum cleaner apparatus for operatively securing a hand held vacuum cleaner (**11**) having a housing (**20**) comprising a motor-fan unit (**22**), a dust container (**31**), and an air passage (**27**), the vacuum cleaner apparatus comprising:

a shaft part (**10**) to which the housing can be removably secured, the shaft part comprising a handle (**16**) and one or more batteries (**18**);

a floor nozzle (**12**); and

a tube passage (**15**) configured to connect the floor nozzle to the air passage when the housing is secured to the shaft part.

2. The vacuum cleaner apparatus according to claim **1**, wherein the shaft part (**10**) further comprises an electric circuit operably connected to said one or more batteries (**18**).

3. The vacuum cleaner apparatus according to claim **2**, wherein at least a part of the electric circuit is operably connected to the hand held vacuum cleaner (**11**) via a connection (**25**) when the housing (**20**) is secured to the shaft part (**10**).

4. The vacuum cleaner apparatus according to claim **3**, wherein the shaft part (**10**) further comprises an operating knob (**17**) that is operably connected to the hand held vacuum cleaner (**11**) via at least a part of the electric circuit when the housing (**20**) is secured to the shaft part.

5. The vacuum cleaner apparatus according to claim **1**, wherein the shaft part (**10**) further comprises an electrical charger connection to charge the one or more batteries (**18**).

6. The vacuum cleaner apparatus according to claim **1**, wherein the floor nozzle (**12**) comprises an electrically driven bush roll (**13**).

7. The vacuum cleaner apparatus according to claim **6**, wherein the electrically driven bush roll (**13**) is driven by an electric motor, said motor receiving energy from the one or more batteries (**18**).

8. The vacuum cleaner apparatus according to claim **1**, wherein the motor-fan unit (**22**), when activated, is supplied with energy by means of the one or more batteries (**18**) when the housing (**20**) is secured to the shaft part (**10**).

* * * * *